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ABSTRACT

This study attempted to develop a reliable and valid instrument for assessing work environment and continuous quality improvement efforts in the non-academic sectors of colleges and universities particularly those institutions who have adopted Total Quality Management programs. A model of a work environment for continuous quality improvement was developed and an instrument was designed to assess non-academic staff's perceptions of the quality process, practices, and results at the University of Michigan (UM). A literature review identified major organizational and higher education models of quality improvement. Researchers designed a study instrument of 217 items which was evaluated by pilot testing with focus groups of UM staff. The final instrument consisted of 201 items that incorporated 35 "quality culture and climate" dimensions. Items focused on perceptions at the respondents' immediate work "unit" level. All permanent non-academic staff completed the questionnaire in February 1994. Of 10,400 questionnaires distributed 4,900 were completed and returned. Results were subjected to data reduction, index development, and reliability and validity testing from which 27 factors emerged. Reliability for indices ranged from .53 to .96. Extensive appendixes contain details of methodology, factor analyses, indices descriptions, and comparisons of conceptual categories and factor indices of a quality culture and a quality climate. (Contains 44 references.) (JB)

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ASSESSING THE CULTURE AND CLIMATE FOR QUALITY IMPROVEMENT IN THE WORK ENVIRONMENT

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Jean Endo
Editor
Forum Publications

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ABSTRACT

Despite the enormous amount of energy that colleges and universities spend on implementing quality improvement initiatives, few institutions have developed methods for assessing the work environment for continuous quality improvement. The goals of this study are to provide administrators and institutional researchers with a means for better understanding the climate and culture of their institution's non-academic work environment and for assessing continuous quality improvement initiatives. This paper reports on a research study which developed a reliable and valid instrument for assessing the climate and culture of a university's work environment for continuous quality improvement.

A model of a work environment for continuous quality improvement was developed and an instrument was designed to assess non-academic staff's perceptions of the quality processes, practices, and results within this environment. The survey results were subjected to data reduction, index development, and reliability and validity testing. The implications of the findings for institutional use and further research are discussed.

ASSESSING THE CULTURE AND CLIMATE FOR QUALITY IMPROVEMENT IN THE WORK ENVIRONMENT

I. INTRODUCTION

Colleges and universities from all sectors of education have implemented a variety of institutional initiatives for continuous quality improvement (Seymour, 1993). The purpose of these initiatives has been to improve the overall quality of the institution. Yet few postsecondary institutions have attempted to systematically assess the work environment designed around the practices, processes, and values implicit in a climate or culture for continuous quality improvement. A review of the literature on quality in higher education shows little consensus regarding the concepts and dimensions which constitute continuous quality improvement in postsecondary education. The literature also includes no systematic quantitative research conducted on quality improvement dimensions, and therefore, no empirical foundation exists for examining the initiatives.

The purpose of this paper is to develop a research based instrument for assessing the climate and culture for continuous quality improvement among non-academic staff in higher education. The paper is based on a research project which examined the work environment perceptions of non-academic employees at the University of Michigan. A framework for examining the institutional activities, processes, and value dimensions in a work environment stressing continuous quality improvement is developed. The study describes the development, the design, and pilot testing of a survey instrument, the process of data reduction and index development and the broader implications for higher education institutions.

II. Research Questions

The primary research questions addressed by this study are:

1. What is an appropriate conceptual framework for examining the work environment for continuous quality improvement in a higher educational setting?

2. What are the appropriate dimensions which constitute a culture and climate for continuous quality improvement in that environment?

3. Can reliable and valid measures and indices reflecting the dimensions be developed in an instrument designed to measure participants' perceptions of their work environment?

III. Literature Review

The literature relating to total quality management (TQM) in business and industry, TQM or continuous quality improvement as applied to the higher education setting, and organizational culture and climate was reviewed for this study. These publications were used to identify a the elements or dimensions of a culture or climate for continuous quality improvement within the higher education work environment. The final purpose of this literature review was to find current examples of quality improvement dimensions outlined for higher education and determine the extent of systematic quantitative research that has been conducted in defining these dimensions.

Overview of Total Quality Management

Total Quality Management is a system's oriented approach to managing the continuous improvement of institutional quality. It is grounded in dual lines of research-- statistical quality control and behavioral science studies of organizations (Kahn, 1993). In the early 1930's, Walter Shewhart (Keller, 1992) began to use sampling and statistical techniques to "control quality into" the

products at Bell Laboratories. The importance of systematic process improvement was realized and the era of statistical quality control was born (Garvin, 1988). Deming (1986), Juran(1988), Crosby (1988), Feigenbaum (1991), Imai (1986), and Ishikawa (1982) advanced and broadened this statistical approach to quality by integrating human relations and organizational aspects of quality management. The period of the 1950's to the 1980's became known as the quality assurance era as industry in the United States began to adopt and implement quality improvement initiatives (Seymour, 1993; Garvin, 1988).

Higher Education and Continuous Quality Improvement

As large corporations in the United States like Ford Motor Company, Xerox, and Procter and Gamble began to achieve success by utilizing quality improvement principles, institutions of higher education began to look at TQM as a means of remaining viable in an increasingly competitive environment (Robinson, Akers, Artzt, Polling, Galvin, & Allaire, 1991; Peterson, 1992). Concurrently, several external reports critical of higher education led calls for increased accountability for college and universities. These reports, which included *A Nation at Risk: The Imperative for Educational Reform* (U.S. Department of Education, 1983), *Involvement in Learning: Realizing the Potential of American Higher Education* (National Institute of Education, 1984), *To Reclaim a Legacy* (Bennett, 1984), and *Integrity in the College Curriculum* (American Association of Colleges, 1985), challenged academic leaders in higher education to more closely assess the results of educational processes (Peterson, 1993).

In 1989, leaders in professional schools and community colleges began to write about the application of Total Quality Management to higher education and university leaders soon followed (Peterson and Cameron, et. al., 1993). Quality became viewed as an opportunity and emphasized as a strategic management function. It was included in strategic planning processes and began to become "managed in" (Garvin, 1988). As this began to happen, the conception of quality shifted from being defined by the organization to being defined by the customer. This led to multi-dimensional and sometimes mutually competing views of what constituted quality, given the multiple stakeholders in higher education (students, faculty, staff, alumni, and the public). The

importance of focusing on the needs of stakeholders, institution-wide involvement, and group problem solving and decision-making was common in higher education and already a well developed in the behavioral science research on organizations (Kahn, 1993). Higher education has begun to embrace the principles of quality management and examples of quality improvement initiatives can be found across all sectors of institutions (Seymour, 1993). While college and university quality initiatives are increasingly numerous, they are primarily limited to the administrative and business functions of the institution, and assessments of the nature and results of these initiatives have been limited.

Work Environment and Organizational Culture and Climate

An organization's work environment can be portrayed in several ways: 1) as objective patterns of behavior or working conditions; 2) as the perceived patterns of behavior and attitudes related to that environment; or 3) as the underlying values and beliefs of the organization or its participants. These concepts are often referred to as the organization's culture or climate and provide members with an understanding of the meaning of their organization and their internal work environment (Peterson, Cameron, Jones, Mets, and Ettington, 1986; Peterson and Spencer, 1990). Culture and climate also provide a framework for members of the organization to make sense of the nonrational and informal aspects of their institutional environment (Peterson and Spencer, 1990).

Schein (1985) defines culture as the basic assumptions and beliefs that are shared by the organization. Dennison (1990) states that organizational culture is comprised of shared values, beliefs, and principles. Specifically focusing on higher education, Peterson and Spencer (1990) term institutional culture as the "organizational glue" that holds the organization together. Chaffee and Tierney (1988, p.5) define institutional culture as "the collective values held by members of the organization [which] derive [their] force from the traditions, processes, and goals held by those most intimately involved in the organization's working." In higher education, cultural values are inherent in the institution's history, tradition, academic mission, governance processes, administrative methods, and delivery processes (Keller, 1983; Chaffee and Tierney, 1988; Peterson and Spencer, 1990; and Austin, 1990).

Climate is defined (Peterson, Cameron, Jones, Mets, and Ettington, 1986) as the "current, common patterns of important dimensions of organizational life or its members' perceptions of and attitudes toward them." Institutional climate is also defined (Schneider and Rentsch, 1988) as organizational policies, practices, and procedures that communicate the goals that are important to an organization and create a sense of institutional imperative. Peterson and Spencer (1990) contrast climate as the organizational "atmosphere" with culture as the organizational "values".

Organizational culture and climate affect attempts to implement quality improvement initiatives in higher education. Incorporating these initiatives requires integrating the elements of improvement initiatives into both the culture and the climate—the beliefs and the practices—that frame all institutional efforts (Bemoski, 1991; Coate, 1991; Seymour and Collett, 1991). Seymour (1993) has identified a "culture of quality" in which members develop, share, and continually reinforce a common understanding of what quality is and how to pursue it. Cameron (1994, p. 15) defines an organization's quality culture as "the general orientation or definition of quality adopted by an organization." This general orientation consists of the way members of an organization think about quality, approach quality, and define its main objective. In his study of 68 automotive companies, Cameron found these organizations "differ in terms of their values, assumptions, beliefs, and meaning (i.e., their culture) regarding quality." Since culture provides the organizational context in which all activities are performed, quality culture is manifest in the organization's policies, practices, and procedures which comprise organizational climate (Cameron, 1994). Thus the literature provides a conceptual view of the culture and climate on which to build an empirical foundation for examining continuous quality improvement in the industry. However, there is little consensus on the dimensions which relate to a culture or climate for quality improvement in higher education.

Quality Dimensions in Business and Industry

Table 1 shows the many sources that have been instrumental in describing the elements and suggesting the dimensions of organizational quality management. Deming (Walton, 1986) outlines fourteen points that he identifies as the basic principles of quality management. These fourteen points

form a "philosophy of management", with which statistical control methods are consistent (Walton, 1986). They have widely contributed to the formation of dimensions of quality indicators across industry sectors (Miller, 1991).

A second major source is the work of the Juran Institute for Quality. It's primary focus is on the dimensions of planning functions and customer satisfaction for both product and service oriented organizations (Juran, 1992). The quality dimensions outlined by this Institute are framed in the Juran Trilogy of quality planning, quality control, and quality improvement (Juran, 1992).

A third source of dimensions is the Malcolm Baldridge National Quality Award Program (National Institute of Standards and Technology, 1994). This award is made annually to manufacturing companies, service companies, and small businesses which are recognized as excelling in quality management and quality achievement.

A fourth source which has been widely utilized in industry is entitled ISO9000. ISO9000 certification demonstrates the ability of an organization to control processes that determine the acceptability of the service provided (Rabbit & Berg, 1993). The ISO9000 criteria are focused on the data collection and product control. They include use of statistical methods, quality records and documentation, after-sales servicing, control of processes, and quality costs.

A fifth source is the Crosby Perspective (Crosby, 1980) which illustrates the key actions necessary in implementing a quality management program. This perspective goes beyond production management and into office management and includes dimensions such as management commitment, teamwork, measurement, communication, training, and goal setting.

The Cameron model is a sixth source. Cameron (1994) utilized the Baldridge Award criteria to supplement his self-developed dimensions of quality improvement to conduct two different studies assessing quality values, processes, and practices in the work environment in approximately one hundred businesses associated with the automotive industry. These studies offered an empirical foundation for examining dimensions of an organization's work environment which stresses a culture and climate of quality. These seminal works, along with numerous other more minor sources, were reviewed to identify the various perspectives and elements of total quality management which have been advanced.

[INSERT TABLE 1]

Quality Dimensions in Higher Education

Peterson (1982, p.188) states that, "Higher education institutions are justly criticized for poor management or inefficiency; they seize a tool, technique, or approach from another setting (often business or government) without examining how it worked there or whether it can work without modification; and they become disenchanted and reject it or go through agonizing reappraisal." Table 2 shows several higher education authors who have attempted to identify dimensions of continuous quality improvement as applied to higher education. Marchese (1991) identified twelve "TQM themes" present in improvement initiatives in colleges and universities. Sherr and Lozier (1991) outline five dimensions of a "complete theoretical system" of quality improvement in higher education. In a survey of twenty-two institutions he identified as "pioneering colleges and universities" which had implemented quality improvement initiatives, Seymour (1993) identified ten dimensions of quality improvement. Chaffee offered eight dimensions in her work written in 1990. Qualtec and the University of Michigan developed eight dimensions characterizing the key elements necessary for a continuously improving university. Sylwester and Harris (1991) narrow the dimensions of quality improvement initiatives to three keys to successful cultural adjustment.

The review of the literature related to quality improvement in higher education reflected that there had been no systematic research conducted on quality improvement dimensions. The numerous definitional elements listed in both the business and the higher educational models provided a foundation for a dimensional analysis of continuous quality improvement in higher education. From a content analysis of the works cited above and over one hundred other articles related to total quality management in business and industry and continuous quality improvement in higher education—annotated in *Total Quality Management in Higher Education: From Assessment to Improvement* (Peterson, Cameron, et. al., 1993)—thirty-five elements of TQM in higher education have been identified. These elements of quality reflect the values, principles, practices, techniques and management strategies and other fundamental ideas which have been suggested by these works. Appendix 1

lists the thirty-five elements of continuous quality improvement identified in this review and analysis.

[Insert Table 2]

IV. Conceptual Framework

Based on the literature review and the preceding content analysis, broad dimensions for examining a quality oriented higher educational work environment were identified. The thirty-five elements of continuous quality improvement were clustered into thirteen conceptual categories of a culture and climate for quality improvement in the work environment developed by Cameron (1994).

A conceptual framework was then developed for examining the contextual influences which the literature suggests might affect the culture and climate of the work environment and the results which might be expected from a quality oriented work environment (see Figure I). The conceptual framework which is divided into four main areas: 1) external influences on the unit work environment, 2) culture: quality oriented values and philosophy, 3) climate: quality oriented work processes and support practices, and, 4) expected outcomes or impact of a quality oriented unit work environment. (These are discussed in the following sections). The central conceptual component of this model focuses on employee perceptions of their immediate work environment's quality culture and its climate of quality oriented processes and practices. Those include the thirteen dimensions which are indicators of the culture and climate for quality in higher education institution's non academic work environment. The development of an instrument to measure the quality oriented culture and climate of a college or university's non-academic employee's work environment is the central focus of this paper.

Influences on the Unit Work Environment

The climate and culture of the unit work environment may be influenced by a number of external factors. The conceptual model developed for this project suggests that there are four major sources which combine to affect employee's perception of the unit work environment. The influences on the unit work environment are indicated by four domains listed under the label of "other

environments" in Figure 1. First various pressures and dynamics of the environment external to the institution may influence the unit work environment and includes things such as the broader social, political, economic and competitive context and the external institutional environment. A second major source which affects the climate and culture of the unit work environment includes the characteristics of the institution in which the unit is a part. Institutional characteristics such as the mission, values, size, type, history, and organization of a college or university will influence the work environment of the unit. The third major source which may influence relates to the characteristics of the work unit itself. These characteristics include the function of the unit, the organizational design of the unit, the unit's relationship to other units both horizontally and vertically within the institution, the size of the unit, and the leadership of the unit. Finally, there are individual factors such as employee's gender, ethnicity, race, education, training, years at institution, etc. which may influence their perceptions of the unit work environment.

Cultural Categories: Quality Oriented Philosophy and Culture

The quality improvement dimensions which emerged from the literature were characterized as being either a part of a culture reflecting quality oriented values and philosophy or as a climate reflecting the emphasis on quality oriented work processes and support practices. The culture and climate of the work environment are the center of this model. Culture dimensions were organized into three conceptual categories identified as being integral to a unit's quality oriented culture and philosophy: 1) quality philosophy, 2) quality improvement culture, and, 3) organizational culture (Figure 1).

Quality Philosophy Quality philosophy refers to the way staff members in a particular unit fundamentally feel about continuous improvement and the way they think about quality in their work environment. Quality philosophy includes staff members perceptions of the role of quality in their unit's mission and purpose, willingness to change and improve, propensity to interact and share success stories, priorities relating to quality, and concerns for quality service. It is grounded in a philosophy of continuous quality improvement or a willingness to change.

Quality Improvement Culture Quality improvement culture focuses on the embedded understandings and the general values, beliefs, or customs relating to a concern for continuous improvement. It includes service orientation, leadership for improvement, teamwork and collaboration, staff development, downsizing approaches, and other key measures of continuous quality improvement.

Organizational Culture Organizational Culture focuses on an overall values and underlying standards which reflect the way employee's perceive the organizational nature of their unit. It includes dimensions related to the unit's dominate organizational characteristic, leadership style, criteria for success and management style (Cameron 19).

Climate Categories: Quality Oriented Work Processes & Support Practices

In addition to cultural categories, ten conceptual categories describing a unit's climate were identified (Figure 1). Climate categories relate to a unit's quality oriented work processes and support practices which are integral to continuous improvement. They include: unit climate, planning for improvement, satisfying those served, work processes, collecting and using information, unit efficiency, leadership, unit staff members, improving performance, and unit performance indicators.

Unit Climate Unit climate refers to the general atmosphere or mood within the work unit. It focuses on how employees feel about their daily interactions with co-workers, superiors and the work itself. Unit climate refers to general dynamics in the workplace including a sense of community, cooperation, teamwork, trust, and enjoyment. Unit climate also refers to freedom from fear and criticism, positive interpersonal and inter-unit relationships, and a feeling of being valued, accepted, and sought after for input.

Planning for Improvement Planning, improvement, and innovation are the focus of this category which refers to activities and understandings of unit reflecting those concerns. Specifically, it refers to the extent to which a unit has

improvement plans in place that are known, understood, and utilized by individual unit members. It addresses the involvement that individuals have in planning and the level to which planning has been personalized. The unit's ability to continuously improve its planning is also included. A unit's focus on innovation includes the degree to which employees seek innovation, are rewarded for successful developments, and are not punished for taking risks or making mistakes.

Satisfying those Served Service to the unit's clients, service recipients, customers, beneficiaries, stakeholders, or constituents, is the focus of this dimension. Satisfying those served by the unit encompasses the identification of internal and external groups, the understanding of their needs and expectations, the use of procedures to gather their input, the utilization of the information for improvement, and a general concern for anticipating and satisfying those who are served.

Work Processes The work processes dimension examines the key elements of improving the design of basic day-to-day work processes. It includes a concern for understanding and improving all the unit's processes which are problematic or problem-free. The category focuses on process assessment, efficiency, and effectiveness. This includes using systematic methods, front-line staff members, and problem solving teams for assessing why mistakes occur and how problem-free processes can be improved. The dimension also examines the scope and effectiveness of process improvement and the degree to which a holistic approach is taken based on information from those being served.

Collecting and Using Information The collecting and using information category examines the scope, collection efforts, and effective use of data and information. It assesses the degree to which information is collected and utilized in areas such as: individual and unit success, achievement, and innovative ideas; timeliness, mistakes, and complaints; employee performance; customer and employee satisfaction; benchmarking; and the data collection and utilization process itself. The dimension also examines the clarity and utilization of quality indicators or standards and the degree to which those most responsible utilize the information.

Unit Efficiency This category relates to the ways in which work is organized to increase the unit's efficiency. Unit efficiency focuses on the reduction of time and resources used to accomplish a unit's work. It includes reducing unproductive employee time; reducing the cycle time to respond to those served; reducing costs and waste; reviewing, reorganizing, and simplifying work processes; and developing time standards for work activities.

Leadership The leadership category examines unit leaders' personal approach to and involvement in developing a unit which continuously improves quality and has a clear understanding of quality values. This includes the degree to which the leader communicates and stresses the importance of quality improvement, manages by facts, is open to new ideas and change, removes barriers and obstacles, reallocates resources based on quality values, and leads by example.

Unit Staff Members The unit staff members category examines how the unit's human resources are enabled to develop a continuous quality improvement philosophy and to reach their full potential as contributors. For example, it focuses on staff member opportunities to participate in education or training on total quality and work improvement concepts and techniques, rewards for staff members for achieving quality objectives, staff member opportunities to participate in personal and professional growth and development activities, and improvement of human resources development programs. This category also examines the extent to which conditions in the unit are conducive to full participation, to staff members being treated with dignity and respect and to sensitivity to one another's needs. Further, it focuses on staff members having the necessary knowledge and resources to accomplish their work.

Improving Performance This category focuses on morale, group dynamics, and the working relationships among staff members as they attempt to improve performance. Issues such as trust, loyalty, helpfulness, criticism, communication, and openness between staff members are examined. It also examines emphasis on time standards, reducing waste, improving and measuring of performance improvement.

Unit Performance Indicators The unit performance category refers to how a unit's performance compares to other similar units. It looks at perceptions of and information about whether the unit is performing at a level higher or lower than a peer unit. Four areas of comparison are of interest: overall performance, rate of improvement, number of errors and mistakes, and costs of services.

Impact of a Quality Oriented Work Environment

The outcomes or impact of a culture and climate for quality improvement in a unit's work environment are suggested in the literature and are shown in the conceptual framework (Figure 1). The model identifies characteristics of the units products and services, such as quantity, quality, speed, timeliness, and cost; overall unit performance indicators such as employee satisfaction, customer satisfaction, comparative results, structure and design and innovation; and broader institutional benefits or outcomes.

Thus, a comprehensive review of the literature yielded thirty-five quality dimensions which were then clustered into thirteen broad conceptual categories of a culture and climate for quality in the work environment. The thirteen culture and climate categories constitute the unit work environment within a conceptual framework suggesting contextual influences on and outcomes of that work environment.

V. Methodology

Study background

In 1989, the University of Michigan began the development of an institution-wide continuous quality improvement initiative designed to "pursue a problem-solving approach that would enlist the energy, intelligence, and imagination of administrators and staff in improving...work systems (University of Michigan, 1994)" entitled "M-Quality." *M–Quality: Continuous Improvement at The University of Michigan* (1992) focused primarily on the administrative functions of the University, and outlined a long-term strategic quality improvement initiative to be implemented in three stages over four years. This plan was

adopted by the University of Michigan in 1992. The first stage was designed to integrate the initiative into the "existing organizational structure of the university (U of M, 1993)." The second stage is projected to implement continuous improvement activity more broadly across the campus. The final stage will commence in 1996, be an ongoing process and will seek to solidify the gains of the first two stages and to integrate quality improvement activities into the daily work of non-academic employers across the University community.

The University is currently in the first stage of implementation and has identified four primary principles as the foundations of the M-Quality initiative. Those are (UM, 1994): 1.) pursuing continuous improvement, 2.) managing by fact, 3.) respecting people and ideas, and 4.) satisfying those we serve. The design of an assessment component and an evaluation strategy is part of this initial stage.

During the Fall of 1993, the U of M's Quality Leadership Team commissioned the development of an evaluation framework and to design an instrument to assess nonacademic staff members perceptions of their work environment. This instrument will provide an ongoing mechanism for assessing the impact of the University's M-Quality improvement-related initiatives. The Work Environment Research Group at the Center for the Study of Higher and Postsecondary Education (CSHPE) was asked to design an evaluation framework, to develop an analytic instrument for measuring the non-academic staff member's perception of their work environments emphasis on continuous quality improvement values, processes, and practices, and to conduct an initial survey of the approximately 10,400 non-academic staff on the Ann Arbor campus; and to prepare a summary report of the results. The instrument development and testing in this survey are the focus of this paper.

Questionnaire Development/Administration

The survey instrument developed and tested in this study was designed in three stages. First, a literature review (reported earlier) identified major organizational and higher education models of total quality or continuous improvement. These models and other literature were content analyzed and the thirty five dimensions of total quality improvement were identified. These

dimensions were arranged across the thirteen conceptual categories of a culture and climate for quality identified in the conceptual framework.

In the second stage, an instrument was designed which contained 217 items reflecting all the quality dimensions and categories (see Appendix 1). Focus groups representing a cross-section of the University's non-academic staff provided feedback on both the construction and content of the instrument. Pilot testing with a random sample of employees representing all job families and functional areas within the institution was used to further refine the instrument. Half of those were interviewed while taking the survey to determine their reactions to the instrument directions, length, clarity, section format, individual items, item redundancy, and clarity instrument response scales. The other half of the pilot respondents took the survey without interruption and were then interviewed for their feedback regarding the aforementioned evaluation criteria. This feedback was integrated in the final version of the instrument.

The instrument consists of 201 items that incorporate the 35 "quality culture and climate" dimensions identified in the literature. The items are distributed over 13 conceptual categories as sections of the questionnaire previously described in the conceptual framework (Figure 1). Eleven of these categories utilized a Likert response scale with six response choices ranging from "strongly disagree" to "strongly agree", "never to always", or "much lower" to "much higher". The scales in two of the quality culture categories (unit improvement orientation culture and unit culture) required dividing 100 points among four offered scenarios to accurately reflect the respondent's perception of the unit's work environment.

Items in the questionnaire focused on perceptions at the respondents immediate work "unit" level. This was done for several reasons: First, respondents are more knowledgeable at this level and their responses are likely to be more accurate. Second, focusing at the unit level allowed for differentiations among the various work units and functional areas of the institution. Finally, the diverse and decentralized nature of the institution was more accurately portrayed at this level but could still be aggregated.

The questionnaire was administered to all permanent non-academic staff at the main campus with half-time or greater appointment during February, 1994. A follow-up post-card was mailed to all respondents two weeks after the

initial instrument was sent. 10,400 questionnaires were distributed and 4,900 usable questionnaires (47.4%) were completed and returned. Table 3 shows response rates by job family and functional care of the university. Data gathered from this survey provides the basis of this analysis and is the focus of the remainder of this paper.

[Insert Table 3]

Analysis

Data were entered with one hundred percent verification. Item level descriptive statistics were computed. The means, standard deviation and frequency distribution were examined. Cross tabulations compared the response patterns by job family, functional area and certain individual characteristics. These results are not discussed in this paper).

To test the content validity of the items arrayed by conceptual categories of culture and climate (see Figure 1), two groups of factor analyses using a varimax rotation were conducted. In the first analysis all questionnaire items with similar response scales were included. This factor analysis failed to converge. Second, factor analyses were run on each of the thirteen conceptual categories separately.

Based upon these results, **twenty-seven** factors emerged. All questionnaire items were included in the factor on which it had the highest loading (above .40). The items in each factor were examined for content similarity. The results section discusses the indices. Coefficient alpha reliability testis were conducted on each of the twenty-seven indices. Reliability's for these indices range from .53 to .96. The results of the factor analysis and the reliability of the factors are shown in Appendix 2. Appendices 3 and 4 include definition of the factors and comparison of the conceptual categories and factor indices.

VI. Results

Indices of A Quality Culture

Ten culture indices emerged from the factor analyses of the three conceptual categories of culture. Their alpha coefficients were somewhat lower than those of the seventeen climate indices, with a range of .53 to .81.

(Appendix 2). However, given the small number of items in each factor index (4 to 6), this level of reliability still indicates that the ten culture indices reflect appropriate indices to assess the quality oriented culture and philosophy in the work environment.

The Unit Quality Philosophy conceptual category yielded a single factor. This Unit Philosophy index, has a reliability of .81. This index relates to the way staff members in the unit fundamentally feel about quality improvement in their work environment. It specifically focuses on perceptions of their mission and purpose and unit priorities relating to quality.

Four indices emerged from the factor analysis of the conceptual category representing support for the Quality Improvement Culture. The first index, Status Quo (reliability .80), relates to staff members' perception that there have been no changes in the unit improvement orientation as a result of a quality improvement initiative. Items in this index focus on the staff perception that leaders have done little to enhance quality, that quality is not measured, that there has been no attempt to institute quality training, that little consideration is given clients or customers, and that the approach to unit costs is the same as always.

The second of the four indices from the Quality Improvement Culture category is Error Detection (reliability .54). The lower level of reliability reflected in this index may suggest that higher education institutions are not predominantly production and output oriented or that they focus on success rather than error (failure).

The third of the four indices from the Quality Improvement Culture category relates to Error Prevention. This index (reliability .70) focuses on the perception of staff members that there are ongoing, proactive changes in the unit improvement orientation. It includes staff perceptions that leaders try to prevent mistakes, errors, and budget inefficiencies; that attempts are made to exceed the expectations of unit customers or clients; and that team formation is actively encouraged. This index reflects staff perceptions that a quality improvement initiative is being successfully implemented.

The final index from the Quality Improvement Culture category is Continuous Improvement (reliability .76). This index reflects the perception of staff members that there have been constant efforts to address unit improvement orientation and that the quality improvement initiative has become an entrenched aspect of the unit culture. It focuses on the unit's continuously

striving for improvement in the areas of leadership, customer service, cost reduction, and teamwork.

Five indices emerged from the factor analysis of the conceptual category related to support for the Unit Organizational Culture category. The first of these indices is Clan Culture orientation. The Clan index (reliability .53) relates directly to staff members perception that their unit has a strong sense of cohesion and teamwork. This index is characterized by team-oriented management style, loyalty and commitment, teamwork, and a mentor oriented leadership style.

The second index from the Organizational Culture category is Adhocracy (reliability .58). This index relates to a loosely coupled unit culture and focuses on innovation and creativity. Its elements include an innovative leadership style, unit success defined by innovative efforts, and a management style characterized by individual initiative.

Hierarchy (.58) is the third index in this Organizational Culture category. It relates to a bureaucratic unit culture found in more traditional organizational structures. This index focuses on a security oriented unit management style, a focus on policies and procedure that promote stability, success defined by efficiency and stability, and an organizing leadership style.

The fourth index from the Organizational Culture category is the Market culture index (reliability .71). This index relates to a results oriented unit culture. It focuses on an achievement oriented management style, a hard-driving leadership style, success defined by competitiveness, and goal accomplishment as the unifying cultural factors.

The final index from the Organizational Culture category is a single item on Change. This relates to a unit's emphasis on change. It is characterized by a change orientation ranging from leading, adapting, responding, to resisting change within the unit.

Indices of a Quality Climate

Seventeen climate indices emerged from the ten factor analysis of each of the ten conceptual categories of climate. The coefficient alpha for the indices ranged from .83 to .96. This level of reliability indicates that the climate indices reflect strong dimensions or indices to assess a work units climate for quality reflected by its quality oriented work processes and practices.

Six of the climate indices which emerged from the factor analysis were synonymous with the conceptual categories of in the survey instrument. Their reliabilities ranged from .89 to .96. Those are the Supportive Unit Climate index (.95), Planning for Improvement and Innovation index (.94), Satisfying Those Served index (.89), Work Processes index (.94), Unit Efficiency index (.89), and Unit Leadership index (.96).

Three climate indices emerged from the factor analyses of the conceptual category related to support for Collecting and Using Information. Collecting Information (reliability of .89) represents a measure of the extent to which information is collected within the unit. The Use of Information index (reliability of .83) relates to the extent to which information is used within the unit. The third index is Role of Information (reliability .94). This index reflects to the clarity and utilization of quality standards and the degree to which those responsible within a unit are given the information they need to accomplish their goals.

Two climate indices emerged from the factor analyses of the conceptual category related to the Unit Staff Members. The first Staff Relations index (reliability .93) reflects the dynamics of working relationships within the unit and focuses on the activities which are conducive to full participation in the unit. The second index, Professional Development (reliability .88), reflects how staff members are enabled to develop their full potential as contributors to a quality improvement initiative. It focuses on staff members' opportunities to participate in education or training on work improvement concepts and techniques.

Two climate indices emerged from the factor analysis related to the conceptual category support for Improving Performance. The first index, Supportive Staff Relationships (reliability .96) reflects the working relationships among staff members directed toward improving the unit's performance. The second index Improving Outputs (reliability .90) includes items that focus on the unit's collective efforts to improve results.

The final four climate indices emerged from the factor analysis of the conceptual category related to support for Unit Performance Indicators. The first Overall Performance index (reliability .84) relates to the overall level of unit performance when compared to similar units, expectations of those served, unit goals, and last year's performance at the same time. The other three indices, the Rate of Improvement index (reliability .90), Number of Errors and Mistakes

(reliability .89), and Costs of Services indices (reliability .87) all relate to comparison of those three dimensions on the same comparisons.

VII. Discussion and Conclusions

The research conducted for this paper initially identified thirty five potential culture and climate dimensions of work environment emphasizing a quality improvement. These dimensions were then incorporated into a theoretically based framework containing three quality culture and ten quality climate categories for examining the values, practices and procedures that support quality improvement in a higher education work environment. This conception provided the foundation for then developing a survey instrument to measure participants' perceptions of the quality oriented work environment.

This instrument is the first empirically based measurement instrument designed to assess the culture and climate for quality improvement in the non-academic work environment in higher education. Twenty seven factor based indices emerged which have a high degree of reliability and common content. Seventeen indices measure the climate for quality represented by a unit's quality oriented work process and support activities. Ten indices measure a culture for quality in the work unit.

The instrument needs to be tested in other settings. The items in the questionnaire are higher education oriented and not biased toward any particular type of institution. It, however, was designed for the non-academic staff and is probably not appropriate for a faculty or student response group.

The instrument can be used either for building indices of a quality oriented work environment or individual items can be examined. Within an institution, profiles of the indices can be developed for the entire institution or to compare functional groups, job classifications or other work units with data appropriately aggregated. It can also be used for making cross institution comparisons or assessing change over time in a given institution.

The instrument and the larger model suggest more conceptually oriented research which can look at the influence of external forces on a quality oriented environment, the success of different strategies of introducing quality, the resulting impact of a quality oriented work environment or the influence of individuals on the quality oriented work environment.

Clearly, additional studies need to be conducted to increase the external validly and generalizability of this instrument. These studies should include a wider array of institutional types. However, there are two primary implications of this effort. First, it provides an instrument that provides administrators and institutional researchers with a means for better understanding the climate and culture for assessing continuous quality improvement in their institution's non-academic work environment. Second, it provides higher education researchers with a reliable instrument with which to evaluate quality improvement initiatives into higher education institutions and to examine the impact of a quality oriented work environment. It should help move quality improvement in higher education from the realm of belief, promotion and case description to an examined, conceptually sound approach to management in higher education

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ADDENDA

ASSESSING THE CULTURE AND CLIMATE
FOR QUALITY IMPROVEMENT IN THE WORK ENVIRONMENT

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Table 1.

Conceptual Models of Total Quality Management Dimensions

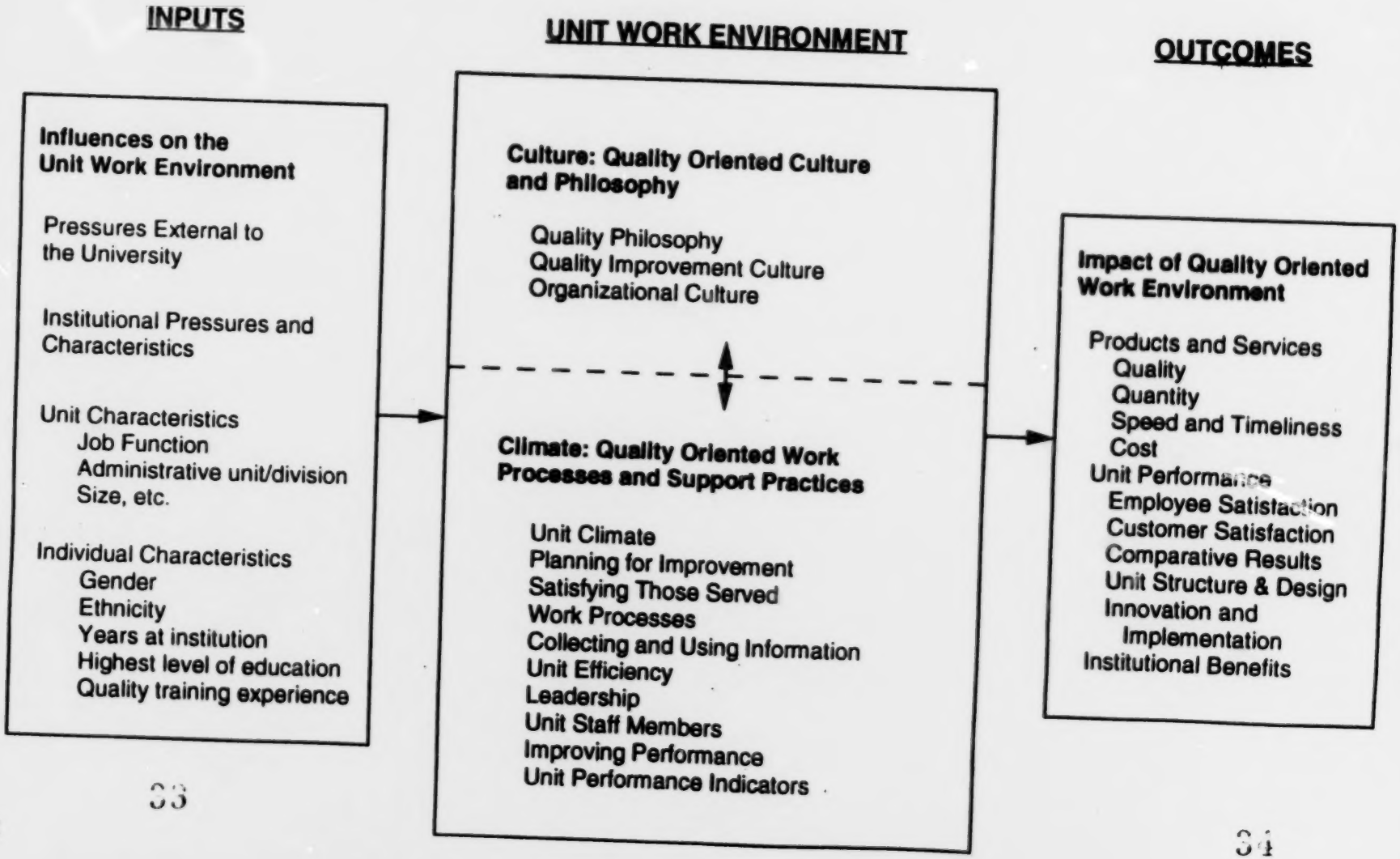
Author/Model	Dimensions
W.E. Deming/ Fourteen Points	constancy of purpose toward improvement; adopting new philosophies; cease dependence on mass inspection; awarding not based on price alone; improve constantly and forever the system of production and service; institute training; institute leadership; driving out fear; breaking down barriers between staff areas; eliminating slogans; eliminate numerical quotas; remove barriers to pride of workmanship: institute a vigorous program of education and retraining; take action to accomplish the transformation
Juran Institute of Quality	thinking about quality planning, establishing quality goals, identifying the customers; determine customer needs; provide measurement; develop product features, develop process features; transfer process controls to operations; application of quality planning
Malcolm Baldridge National Quality Award Program	leadership; information and analysis; strategic quality planning; human resource development and management; management of process quality; quality and operational results; customer focus and satisfaction
ISO9000	customer service; process versus results focus; management commitment/responsibility; continuous improvement; less than 20% of problems caused by workers; performance measures; cross functional councils create constancy
Crosby Steps	management commitment; teamwork; measurement; communication; training; goal setting; zero defects
Cameron Model	leadership, information and analysis; quality planning; human resource utilization; quality assurance; customer satisfaction; cultural priorities; climate; cost containment; quality results; speed and timeliness; structure; innovation; quality culture

Table 2.
Conceptual Models of Higher Education Quality Improvement Dimensions

Author	Dimensions
Marchese	focus on quality; customer orientation; continuous improvement; making processes work better; extending the mindset; the discipline of information; eliminate rework; teamwork; empowering people; training and recognition; vision; leadership
Sherr and Lozier	mission and customer focus; systematic approach to operations; vigorous development of human resources; long-term thinking; institutional commitment
Seymour	giving people a voice; less explaining; cutting down steps; a change in climate; willingness to "sweat the details"; bringing people together; development of a common language; knowing what we are about; reduced rework and scrap; "declining dollars"
Chaffee	commitment to quality, ethic of service, data and analysis management, "invisible" data use, respect and listen to all associates, support people in their jobs, teamwork, error prevention.
Qualtec/M-Quality	pursuing continuous improvement, respecting people and ideas, managing by fact, satisfying those served, teamwork, planning, and quality in daily activities, quality environment
Sylwester and Harris	committed presidential leadership; process orientation; involvement of all personnel

FIGURE 1

Conceptual Framework For Assessing A Quality Oriented Work Environment



Appendix 1: Quality Dimensions (35) by Quality Categories (13)

	QUALITY DIMENSIONS																																							
QUALITY CATEGORIES	leadership	mission	shared mission	openness	customer care	employee care	customer loyalty	employee loyalty	standards	no errors	cont. improve: culture	structure	empowerment	involvement	decision	communication	training	responsive to customer	responsive to employee	evaluation	recognition	downsize	feedback	accountability	resources	cooperation	cont. improve: practices	plan	innovation	asking	group work	comparison	showing	data collect	data utilize
Quality Philosophy		x							x		x																												
Quality Improve. Culture	x				x												x					x											x			x		
Organizational Culture	x		x							x	x																				x				x			
Unit Climate				x		x		x	x		x		x		x											x					x							
Planning—Improvement		x													x	x				x	x		x				x	x	x									
Satisfying Those Served					x		x									x		x			x		x				x			x								
Work Processes			x								x	x						x		x		x					x				x	x						
Information Collect/Use																						x	x	x											x		x	x	
Unit Efficiency																						x			x														
Leadership	x	x		x												x			x				x		x														
Unit Staff Members			x			x				x	x		x	x		x	x			x					x														x
Improving Performance																									x					x									
Unit Perform. Indicators				x		x		x	x	x	x				x	x						x				x			x									

Table 3:
Population and Respondents Profile by Job Family

	Overall Population (% of Column Total)	Total Number of Respondents (% of Column Total)	Respondents/ Overall Population (%)
Professional and Administrative	5230 (50.6%)	2421 (49.5%)	46.3%
Nurses	46 (0.4%)	28 (0.6%)	60.9%
Specialists – Technicians	443 (4.3%)	163 (3.3%)	36.8%
Police	83 (0.8%)	25 (0.5%)	30.1%
Office	2733 (26.4%)	1232 (25.2%)	45.1%
Operations Engineers – Trades	359 (3.5%)	289 (5.9%)	80.5%
Service – Maintenance	1152 (11.1%)	523 (10.7%)	45.4%
Allied Health	288 (2.8%)	115 (2.4%)	39.9%
Unknown	NA	7 (0.1%)	
Missing	NA	88 (1.8%)	
TOTAL (% of Overall Population)	10334 (100.0%)	4891 (47.3%)	

APPENDIX 2a

Factor Analysis of the Work Environment: Description of Culture Indices

Index	Items	Cum. % Variance	Reliability
Unit Philosophy	5	57.5%	.81
Status Quo	6	50.5%	.80
Error Detection	6	30.6%	.54
Error Prevention	6	39.7%	.70
Continuous Improvement	6	46.3%	.76
Clan Culture	4	42.7%	.53
Adhocracy Culture	4	45.0%	.58
Hierarchy Culture	4	70.5%	.58
Market Culture	4	53.5%	.71

Index	Items	Cum. % Variance	Reliability
Change/Leading Culture	1		
Change/Adapting Culture	1		
Change/ Responding Culture	1		
Change/Resisting Culture	1		

APPENDIX 2b

Factor Analysis of the Work Environment: Description of Climate Indices

Index	Items	Cum. % Variance	Reliability
Supportive Unit Climate	15	58.4%	.95
Planning for Improvement and Innovation	11	63.4%	.94
Satisfying Those Served	8	57.2%	.89
Supportive Work Processes	13	58.1%	.94
Collect Information	9	41.5%	.89
Use Information	9	60.4%	.83
Role of Information	6	63.4%	.94

Index	Items	Cum. % Variance	Reliability
Unit Efficiency	7	60.6%	.89
Unit Leadership	9	73.3%	.96
Staff Relations	11	54.7%	.93
Professional Development	6	61.7%	.88
Supportive Staff Relationships	13	61.6%	.96
Improving Outputs	7	67.3%	.90
Overall Performance	4	67.9%	.84
Rate of Improvement	4	76.6%	.90
Number of Errors and Mistakes	4	75.3%	.89
Cost of Services	4	72.6%	.87

APPENDIX 3
DESCRIPTIONS OF THE INDICES

Culture and Climate of a Quality Oriented Work Environment

Quality Culture (ten indices):

1. **Philosophy:** five items related to the way staff members in a particular unit fundamentally feel about quality improvement in their work environment; quality philosophy includes staff members' perceptions of their mission and purpose, willingness to change and improve, propensity to interact and share success stories, priorities relating to quality, and concerns for quality.

2. **Status Quo:** six items related to staff members' perceptions that there have been no changes in the unit improvement orientation; status quo includes staff members' perception that unit leadership has done nothing to enhance quality improvement, quality is not measured, there is no attempt to provide quality training, little thought is given to those served, to teams exist, and that approach to costs is the same as always

3. **Error Detection:** six items related to staff members' perception that there have been some changes in the unit improvement orientation; this index focuses on the measurement of errors and mistakes; error detection includes staff perceptions that unit leaders identify improvement areas, errors and mistakes are measured, team formation is supported, quality training is provided upon request, attempts are made to meet the needs of those served, across the board cuts are made to meet budget goals.

4. **Error Prevention:** six items related to staff members' perception that there have been ongoing changes in the unit improvement orientation; this index focuses on the prevention of errors and mistakes; includes staff perceptions that leaders try to prevent mistakes, errors, and budget inefficiencies, team formation is actively encouraged, and attempts are made to exceed the expectations of those we serve.

5. **Continuous Improvement:** six items related to staff members' perception that there have been constant efforts to address unit improvement orientation; this index focuses on the units' continuous striving for improvement;

continuous improvement includes staff perceptions that leaders are continuously raising performance standards, expectations of those served are exceeded, cost are reduced without any effect to service provided, and almost all staff members work in teams.

6. **Clan:** four items related to staff members' perception that their unit has a strong sense of cohesion and teamwork; clan culture orientation includes a team oriented management style, loyalty and commitment as unit wide characteristics, unit success defined by professional development, teamwork, and concern for people, and a leadership style that is mentor oriented.

7. **Adhocracy:** four items related to a loosely coupled unit culture; adhocracy culture orientation includes a focus on innovation and creativity, a innovative leadership style, unit success defined by cutting edge outputs and innovative efforts, and a management style characterized by individual initiative.

8. **Hierarchy:** four items related to a bureaucratic hierarchical unit culture; hierarchy culture orientation includes a security oriented unit management style, a focus on policies and procedure that promote stability, success defined by efficiency and stability, and an organizing leadership style.

9. **Market:** four items related to a results oriented unit culture; market culture orientation includes an achievement oriented management style, a hard-driving leadership style, success defined by competitiveness, and goal accomplishment as the unifying cultural factors.

10. **Change:** four items related to a unit culture of change; change culture orientation includes leading , adapting to, responding, and resisting change within the unit.

Quality Climate (seventeen indices)

11. **Supportive Unit Climate:** fifteen items that relate to the general atmosphere or mood within the work unit; unit climate focuses on how employees feel about their daily interactions with co-workers, leaders, and the work itself; it also refers to the sense of cooperation, teamwork, trust enjoyment and the feeling of being valued, accepted, and sought after for input into decision-making.

12. **Planning for Improvement and Innovation:** eleven items related the unit climate of planning improvement and innovation; this index refers to unit improvement plans and the extent to which they are known, understood, and utilized by individual unit members; it also includes the units focus on the degree to which employees seek innovation and are rewarded for successful developments; the units ability to continuously improve its planning processes is also included.

13. **Satisfying Those Served:** eight items related to service to the units' clients, beneficiaries, stakeholders, constituents, service recipients, or customers; satisfying those that are served by the unit encompasses the identification of internal and external customers, the understanding of customers needs and expectations, procedures in place to gather customer input and utilize the information for improvement, and a general focus on anticipating and satisfying those who are served.

14. **Supportive Work Processes:** thirteen items related to the key elements of improving the quality and design of basic day-to-day work processes; this index includes understanding and improving processes which are both problematic and problem-free; it focuses on process assessment, cycle time reduction, efficiency, and effectiveness; it also examines the scope and effectiveness of process improvement.

15. **Collect Information:** nine items related to the extent to which information is collected within the unit; this index assesses the degree to which information is collected on the following: individual and unit successes, achievements, innovative ideas, timeliness, mistakes, complaints, employee performance, customer and employee satisfaction, benchmarking, and the data collection process.

16. **Use Information:** nine items related to the extent to which information is used within the unit; this index assesses the degree to which information is used on the following: individual and unit successes, achievements, innovative ideas, timeliness, mistakes, complaints, employee performance, customer and employee satisfaction, benchmarking, and the data collection process.

17. **Role of Information:** six items related to the clarity and utilization of quality standards and the degree to which those most responsible are given the required information.

18. **Unit Efficiency:** seven items related to the ways in which work is organized to increase the unit's efficiency; this index focuses on the

reduction of time and resources used to accomplish a unit's work; it includes reducing unproductive employee time, reducing cycle time to respond to those served, reducing costs and waste, simplifying work processes and developing time standards for work activities.

19. **Unit Leadership:** nine items related to unit leaders' personal leadership and involvement in developing a unit which continuously improves quality and has a clear understanding of quality values; this index focuses on leadership communication skills, managing by fact, being open to new ideas and change, removing barriers and obstacles, reallocating resources based on quality values, and leading by example.

20. **Staff Relations:** eleven items related to the dynamics of working relationships within the unit; this index focuses on the key elements which are conducive to full participation in unit activities, it includes staff members being treated with dignity and respect, seeking diversity of opinion, staff participation in decision-making and decision implementation, understanding expectations, understanding quality philosophy within the unit, and maintaining optimum unit resources.

21. **Professional Development:** six items related to the key elements of how the human resources are enabled to develop their full potential as contributors to continuous quality improvement; this index focuses on staff members' opportunities to participate in education or training on work improvement concepts and techniques, rewards for achieving quality objectives, opportunities to participate in personal and professional growth and development, and improvement of human resource development programs.

22. **Supportive Staff Relationships:** thirteen items related to the working relationships of staff members with specific regard to improving the unit's performance; this index includes leaders increasing trust among staff members, staff loyalty increasing, helping co-workers to improve, decreasing complaints of unit leadership, improving unit communication, decreasing conflict within the unit, and increasing cooperation with other units.

23. **Improving Outputs:** seven items related to improving the results of the unit's collective efforts; this index includes improvement of the quality of work, improvement of outputs and services, decrease in customer complaints, continually setting higher work standards, decrease in time required to introduce new services, and decrease in missed deadlines.

24. **Overall Performance:** four items related to the overall level of performance when compared to similar unit, expectations of those served, unit goals, and last year's performance at the same time.

25. **Rate of Improvement:** four items related to the rate of improvement when compared to similar unit, expectations of those served, unit goals, and last year's performance at the same time.

26. **Number of Errors and Mistakes:** four items related to the number of errors and mistakes when compared to similar unit, expectations of those served, unit goals, and last year's performance at the same time.

27. **Cost of Services:** four items related to the cost of services when compared to similar unit, expectations of those served, unit goals, and last year's performance at the same time.

APPENDIX 4a

Comparison Of Conceptual Categories And Factor Indices Of A Quality Culture And Climate

CULTURE

Literature Based Conceptual Categories In Framework	Indices Emerging From Factor Analysis
Quality Philosophy	Unit Philosophy
Quality Improvement Culture	Status Quo
	Error Detection
	Error Prevention
	Continuous Improvement
Organizational Culture	Clan Culture
	Adhocracy Culture
	Hierarchy Culture
	Market Culture
	Change Culture

APPENDIX 4b

Comparison Of Conceptual Categories And Factor Indices Of A Quality Culture And Climate

CLIMATE

Literature Based Conceptual Categories In Framework	Indices Emerging From Factor Analysis
Unit Climate	Supportive Unit Climate
Planning For Improvement	Planning for Improvement and Innovation
Satisfying Those Served	Satisfying Those Served
Work Processes	Supportive Work Processes
Collecting and Using Information	Collect Information
	Use Information
	Role of Information

CLIMATE

Literature Based Conceptual Categories In Framework	Indices Emerging From Factor Analysis
Unit Efficiency	Unit Efficiency
Leadership	Unit Leadership
Unit Staff Members	Staff Relations
	Professional Development
Improving Performance	Supportive Staff Relationships
	Improving Outputs
Unit Performance Indicators	Rate of Improvement
	Overall Performance
	Number of Errors/Mistakes
	Costs of Services